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TEXTILGEBILDE FÜR INDUSTRIELLE ZWECKE
TISSU INDUSTRIEL

- | | |
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Description

The present invention relates to industrial fabrics such as papermachine clothing or like fabrics.

When in use industrial fabrics suffer from the problems of fibre shedding and wear. The present invention seeks to address these problems.

One known method of surface modification for industrial fabrics such as corrugator belts comprise the lick-roll application of water-based acrylic polymer. This process is not particularly reliable.

According to a first aspect of the present invention there is provided a method of making an industrial fabric including the steps of providing a textile substrate, providing a film forming polymer affixed to a release sheet, applying said polymer to a surface of the base cloth, curing the polymer and removing the release sheet so as to provide an industrial fabric having a textile substrate, at least one surface of which is coated with the film forming polymer wherein the polymer coating is reticular. During the coating step impregnation of the textile substrate may occur. Examples of suitable film forming polymers include epoxy resins, plastisols (i.e. a polymer dissolved in the bare minimum of solvent) or aqueous polyurethane systems.

The fabrics of the present invention have particular application as press felts. The fabrics may also be used in corrugator belts in which the polymer coating is applied at the edge regions of the fabric to increase the abrasion resistance of these areas. The fabrics are also suitable as filter cloths where the improved smoothness of the fabric surface resulting from the coating gives improved cake release.

The polymer film provides a harder more wear resistant surface having improved abrasion resistance. It also prevents fibre shedding. A further advantage, when used as a coating for papermakers fabrics, is that the improved surface smoothness reduces the start-up time required on the paper machine. Normally a fabric has initially to be run on a machine for a certain amount of time to smoothen the surface before it can be put into action.

The reticular polymer coatings referred to herein are coatings comprising a network of two dimensional pores thus providing permeability.

According to a second aspect of the present invention there is provided an industrial fabric comprising a textile substrate, wherein at least one surface of the textile substrate is coated with and/or is impregnated by a film forming polymer, the polymer coating being reticular.

The use of the release paper method of resin application enables the fabric heat-setting step to be combined with the resin treatment if desired, and whereas conventional coating processes utilise aqueous resin emulsion systems which require a large energy input to remove water, the method according to the invention consumes only a small amount of energy. The reticulat-

ed resin coating ensures that fibre shedding is reduced due to a more effective bedding down of protruding surface fibres. This method is also advantageous in that the absence of waste effluent or solvents means that the process is more ecologically acceptable. Further refinements include the utilisation of a more uniform of lower denier fibre batt surface. The greater fibre density at the surface, controlled by known methods such as choice of batt fibre denier and/or needling technique, enables a more uniform resin application to be achieved, thereby reducing brittleness by reducing the opportunity for resin-rich areas to form. Toughness can be improved by increasing cure time at the expense of cure temperature.

The release sheet may typically comprise silicone release paper, aluminium foil or polyethylene or PTFE-coated non-woven fabrics. The polymer would be in the form of a film.

The textile substrate may be fed over at least one roller. The release sheet would be fed into the nip between the textile and one of the rollers. The paper is held under tension to prevent creasing. The angle of application of the release sheet to the substrate/roller is preferably in the range from 35 to 55°, and more preferably is substantially 45°. The angle of application is important in ensuring that a uniform resin coating is applied, and for preventing creasing of the release sheet, by ensuring that the release sheet is kept at high tension.

The rollers are preferably heated at 160-200°C depending on the polymer applied, thereby enabling the resin film to be heat cured, although it may be possible to use chemically, moisture or air-curable resins, eliminating the need for heated rollers, although some heat may be required to bring about the desired reticulation. Reticulation depends on the surface characteristics of the release sheet and the influence of heat. The surface characteristics of the release sheet can be selected such that the desired reticulation of resin on the fabric is achieved.

A compaction roller is preferably used to force resin into the fabric surface, enhancing the film smoothness. One or more layers of resin may be applied.

The reticulation of the film can be explained by the fluidisation of the resin at high temperatures which is now unable to wet out the surface of release sheet due to the low surface energy of the paper, and hence form droplets. These droplets interconnect and when applied to the fabric surface they reticulate around the surface fibres.

In order that the present invention may be more readily understood specific embodiments thereof will now be described by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a schematic diagram showing a method of making industrial fabrics in accordance with the present invention; and

Fig. 2 is a plan view showing the reticulation of a res-

in on a release sheet, the release sheet being used in the method of producing a fabric in accordance with the present invention.

Fig.1 shows apparatus 10 for applying an epoxy resin coating. The textile substrate 11 is located over two large rotatable cylinders 12,13 at least one of which being heated.

An epoxy film is provided on a release paper 14. The coated release paper is mounted on a feed roller 15 and fed under tension to the nip between one of the heated drums and the textile. The coating is thus applied to the inside of the fabric belt. The used release sheet is removed as it passes out from the top of the roller and is fed to a take-up roller 16. A compaction roller 17 is optionally provided for forcing resin into the fabric surface region. The coated fabric is turned inside out after curing the resin, so that the resin coated side of the fabric is located on the outside of the belt, i.e. the paper side.

Fig.2 shows a release sheet for providing a fabric with a reticulated coating of epoxy adhesive. The resin coating on the release paper and thus the applied fabric coating have apertures therethrough. These apertures in the resin coating on the fabric expose the fabric located below, thus providing a permeable coating.

EXAMPLE

A sample was obtained by coating a needled press felt with Fibredux 913G, (RTM of Ciba Composites) comprising a water-insoluble polyfunctional epoxy resin (containing modified dicyandiamide) cast on a release sheet to give a film of 34 g/m² thickness, using a roller temperature of 120-160°C, and compaction roller pressure of ca. 20kg/cm².

The fabric treated with two resin layers was found to have an air permeability of 1.7 m³/min (1.8 m³/min) (59.5 (64) cfm), retained 95.7 (85.7)% original thickness after 5000 rubs against a standard carborundum sand-screen at 21 5.8 N (oz) pressure, R_D surface roughness of 28 (32) microns (measured using a Surcom surface profiling device) thickness of 3.47 (3.32)mm and a weight of 1505 (1361)g/M². The figures in brackets are for an untreated sample.

It is to be understood that the above described embodiments are by way of illustration only.

Claims

1. A method of making an industrial fabric including the steps of providing a textile substrate, providing a film forming polymer affixed to a release sheet, applying said polymer to a surface of the textile substrate, curing the polymer and removing the release sheet so as to provide an industrial fabric having a textile substrate, at least one surface of which is

coated with the film forming polymer in such a way that the polymer coating is reticular and provides thus permeability.

2. A method of making an industrial fabric as claimed in claim 1, characterised in that the polymer comprises any of the following: an epoxy resin, a plasticiser or an aqueous polyurethane system.
3. A method of making an industrial fabric as claimed in claim 1 or claim 2, characterised in that the release sheet comprises any of the following: silicone release paper, aluminium foil, polyethylene or PTFE-coated non-woven fabric.
4. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the polymer coated release sheet is fed to the textile substrate at an angle in the range from 35 to 55°.
5. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the polymer coated release sheet is fed to the textile substrate at an angle of substantially 45°.
6. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the polymer is heated in order to cure the polymer and/or bring reticulation.
7. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the industrial fabric comprises papermachine clothing, a corrugator belt or a filter cloth.
8. An industrial fabric comprising a textile substrate, characterised in that at least one surface of the textile substrate is coated with a film forming polymer, the polymer coating being reticular and providing thus permeability.
9. An industrial fabric as claimed in claim 8, characterised in that the industrial fabric comprises papermachine clothing, a corrugator belt or a filter cloth.

Patentansprüche

1. Verfahren zur Herstellung eines industriellen Stoffes, umfassend die Schritte des Bereitstellens eines textilen Substrats, des Bereitstellens eines filmbildenden Polymers, das an einem Abziehblatt befestigt ist, des Aufbringens des Polymers auf eine Oberfläche des textilen Substrats, des Härtens des Polymers und des Entferns des Abziehblattes, um einen industriellen Stoff zu schaffen, der ein textiles Substrat aufweist, von dem wenigstens eine Oberfläche mit dem filmbildenden Polymer be-

schichtet derart ist, daß die Polymerbeschichtung netzartig ist und somit Permeabilität liefert.

2. Verfahren zur Herstellung eines industriellen Stoffes wie in Anspruch 1 beansprucht, dadurch gekennzeichnet, daß das Polymer irgendeines der folgenden umfaßt: ein Epoxyharz, ein Plastisol oder ein wässriges Polyurethansystem. 5
3. Verfahren zur Herstellung eines industriellen Stoffes wie in Anspruch 1 oder Anspruch 2 beansprucht, dadurch gekennzeichnet, daß das Abziehblatt irgendeines der folgenden umfaßt: Silikonabziehpapier, Aluminiumfolie, Polyurethan- oder PTFE-beschichteter, nichtgewebter Stoff. 10 15
4. Verfahren zur Herstellung eines industriellen Stoffes wie in einem der vorhergehenden Ansprüche beansprucht, dadurch gekennzeichnet, daß das polymerbeschichtete Abziehblatt dem textilen Substrat in einem Winkel im Bereich von 35 bis 55° zugeführt wird. 20
5. Verfahren zur Herstellung eines industriellen Stoffes wie in einem der vorhergehenden Ansprüche beansprucht, dadurch gekennzeichnet, daß das polymerbeschichtete Abziehblatt dem textilen Substrat in einem Winkel von im wesentlichen 45° zugeführt wird. 25
6. Verfahren zur Herstellung eines industriellen Stoffes wie in einem der vorhergehenden Ansprüche beansprucht, dadurch gekennzeichnet, daß das Polymer erhitzt wird, um das Polymer zu härten und/oder die Netzstruktur auszubilden. 30 35
7. Verfahren zur Herstellung eines industriellen Stoffes wie in einem der vorhergehenden Ansprüche beansprucht, dadurch gekennzeichnet, daß der industrielle Stoff ein Papiermaschinentuch, einen Rippengurt oder ein Filtertuch umfaßt. 40
8. Industrieller Stoff umfassend ein textiles Substrat, dadurch gekennzeichnet, daß wenigstens eine Oberfläche des textilen Substrats mit einem filmbildenden Polymer beschichtet ist, wobei das Polymer netzförmig ist und Permeabilität liefert. 45
9. Industrieller Stoff wie in Anspruch 8 beansprucht, dadurch gekennzeichnet, daß der industrielle Stoff ein Papiermaschinentuch, einen Rippengurt oder ein Filtertuch umfaßt. 50

Revendications

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1. Procédé pour fabriquer un tissu industriel comprenant les étapes consistant à fournir un substrat tex-

tile, fournir un polymère d'élaboration d'un film apposé sur une feuille anti-adhésive, appliquer ledit polymère à une surface du substrat textile, traiter le polymère et retirer la feuille anti-adhésive de manière à fournir un tissu industriel ayant un substrat textile dont au moins une surface est revêtue par le polymère d'élaboration d'un film de telle manière que le revêtement de polymère est réticulé et fournit ainsi de la perméabilité.

2. Procédé selon la revendication 1, caractérisé en ce que le polymère comprend l'un quelconque des éléments suivants: une résine époxy, un plastisol ou un système polyuréthane aqueux.
3. Procédé selon la revendication 1 ou 2, caractérisé en ce que la feuille anti-adhésive comprend l'un quelconque des éléments suivants: un papier anti-adhésif à base de silicone, une feuille d'aluminium, un tissu non tissé revêtu de PTFE ou de polyéthylène.
4. Procédé selon l'une quelconque des revendications précédentes, caractérisé en ce que la feuille anti-adhésive revêtue de polymère est amenée vers le substrat textile avec un angle compris dans la plage s'étendant de 35 à 55°.
5. Procédé selon l'une quelconque des revendications précédentes, caractérisé en ce que la feuille anti-adhésive revêtue de polymère est amenée vers le substrat textile avec un angle sensiblement de 45°.
6. Procédé selon l'une quelconque des revendications précédentes, caractérisé en ce que le polymère est chauffé de manière à le traiter et/ou à produire une réticulation.
7. Procédé selon l'une quelconque des revendications précédentes, caractérisé en ce que le tissu industriel comprend une enveloppe pour machine à papier, une courroie d'onduleur ou une étoffe filtrante.
8. Tissu industriel comprenant un substrat textile, caractérisé en ce qu'au moins une surface du substrat textile est revêtue par un polymère d'élaboration d'un film, le revêtement de polymère étant réticulé et fournissant ainsi de la perméabilité.
9. Tissu industriel suivant la revendication 8, caractérisé en ce que le tissu industriel comprend une enveloppe pour machine à papier, une courroie d'onduleur ou une étoffe filtrante.

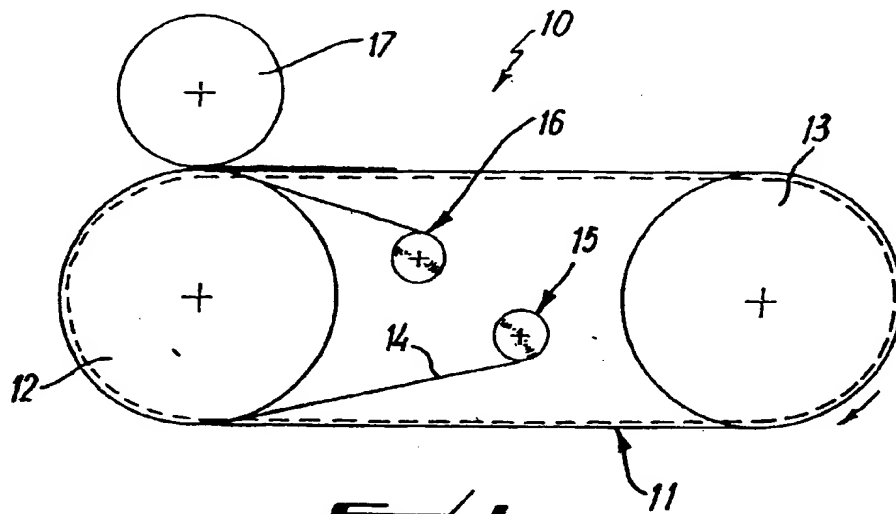


FIG. 1

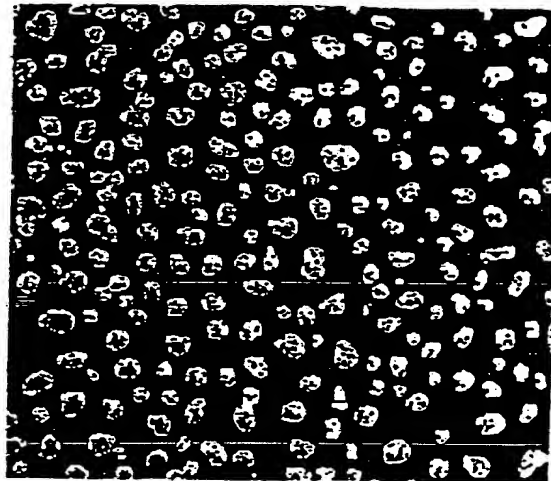


FIG. 2